ESTABLISHED 1947

PAN AMERICAN fisherman

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- ★ Sea Secrets
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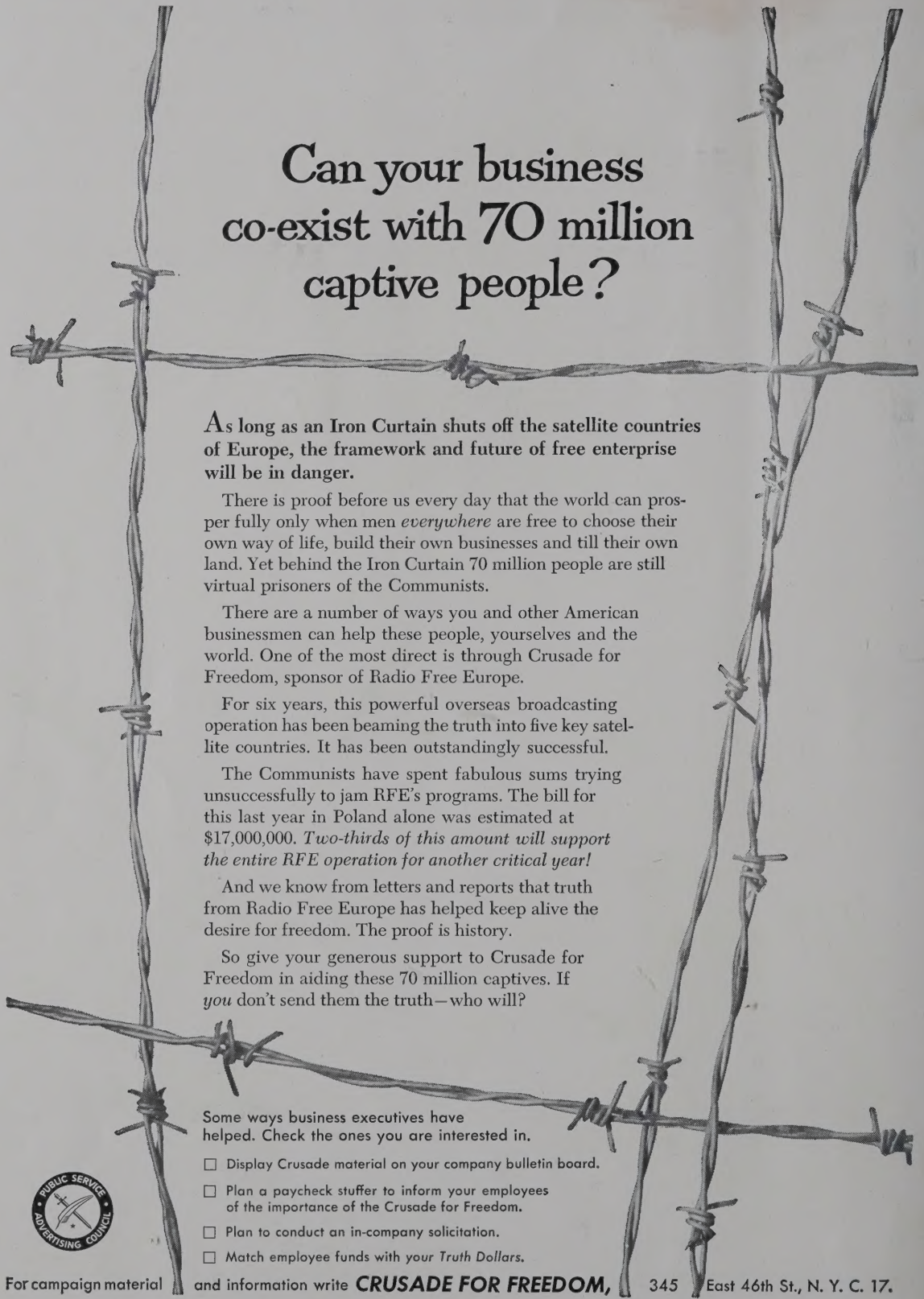

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PAN AMERICAN fisherman

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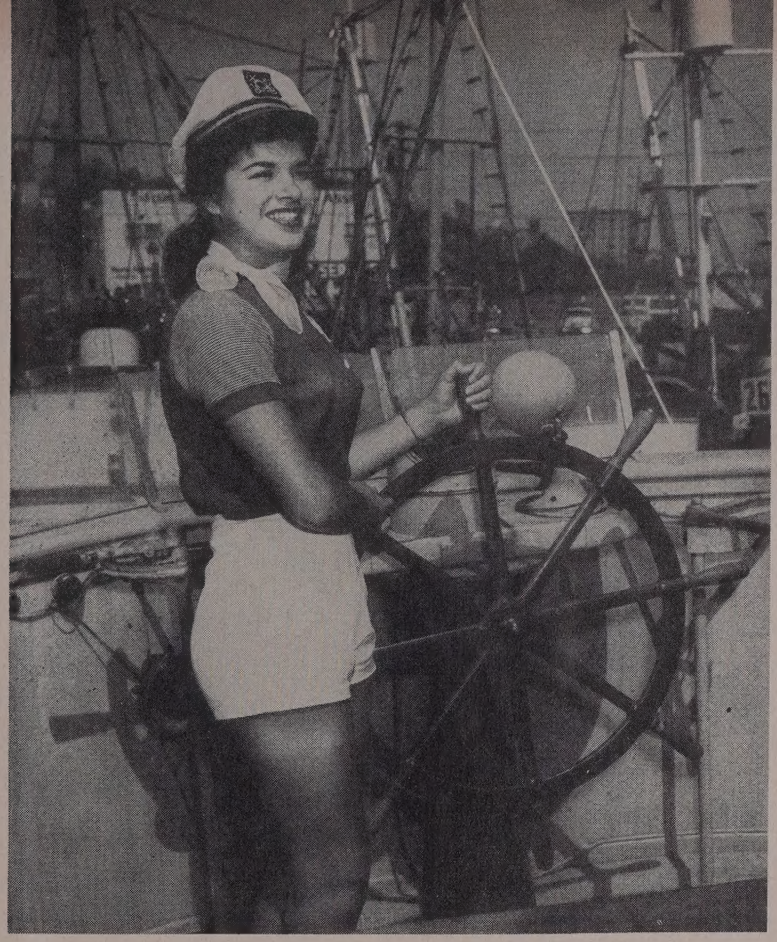


PORT OF LOS ANGELES

A harbor is sort of a hotel for ships, and the Port of Los Angeles is a "Waldorf" for the floating travelers, according to a release from the L.A. Harbor Department.

Whether she's gleaming liner or a rusty freighter, a maritime caller here can get virtually everything needed to make her stay pleasant and facilitate her onward voyage. A work force of more than 15,000 persons labors around-the-clock to see that each vessel is a contented guest.

For example, the basic requirement of fuel is met by 12 barges which can come alongside within minutes after call and begin pumping at an average rate of 1,000 barrels per hour. There are six major marine terminals with modern equipment for efficient, safe fueling.

Another fundamental requirement, potable water, is furnished through dockside connections at more than 100 berths and there are two water barges for vessels at anchor. A half dozen stevedoring firms and Los Angeles Harbor's 4,000 longshoremen swiftly handle cargo problems.

Ships in need of a "shave and a haircut" or a major "face-lifting" can be accommodated at two major shipyards which have almost 4,000 workers. In addition, there are 14 other firms specializing in mechanical services ranging from repair of a boiler or adjustment of a delicate navigational instrument.

Two-score tugs and their crews team up with veteran pilots to aid ships in and out of the port. Besides the ship handlers, there are 29 other tugs available for salvage, repair and long-distance towing operations as well as eight derrick barges. Water taxies provide transport between land and anchored ships.

Almost 50 service firms here and in the Wilmington and San Pedro Districts of Los Angeles Harbor cater to the crews and passengers of visiting vessels.

Provisioners cater to every taste, providing unpolished rice or filet mignon as ordered. They even supply meat that has received the blessing necessary before it can be eaten by the faithful of various creeds.

Then there are laundries, pharmacies, florists, newspaper distributors, travel agents, custom brokers, immigration specialists, physicians and ministers serving the seafarers.

Not a nautical need is overlooked. Not even the unglamorous job of garbage collection. This vital task is handled by a craft incongruously named Ramona.

THE PLIGHT OF THE PISMO CLAM

By John E. Fitch
Senior Marine Biologist
California Dept. of Fish and Game

OFTEN it has been said that, unlike many other activities, clam digging is one of the last great family sports.

Hunters can roam the hills for days without even sighting a buck; duck hunters can sit in damp blinds for hours and never come close to hitting a bird; deep sea fishermen, surf fishermen, pier fishermen, and stream fishermen all can exhaust their patience without a bite.

But not so for the clam diggers.

Men, women, and children from 5 to 85 can be seen at almost any low tide trying their luck, practically always with some success.

The very nature of this silent, sedentary beast precludes its outrunning, out-flying, out-swimming, out-digging, or out-anything-else-ing even the youngest infant. In spite of —or because of—these odds, Pismo clam digging continues to retain a position of high priority as a recreational sport among the sportsmen of the State.

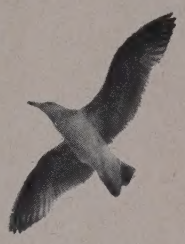
Fortunately for the biologist, the same sluggardly habits which lead to the downfall of the clam lend themselves admirably to a scientific process of censusing.

The Pismo clam census, conducted annually since 1923 by the California Department of Fish and Game, results in far greater knowledge of the clam than just a nose count. Through this census, department biologists keep tab on the condition of the clam population.

Compared with past censuses, it is evident that the clam population at Pismo Beach and Morro Bay is not as robustly healthy as it was in recent years. Neither is it as feeble as it surely will be within a few years.

However, the facts also show that the regulations now in force are entirely adequate to protect the necessary brood stock for the future. Tighter restrictions would only cut down on the amount of clamming that could be enjoyed, without really helping the clams.

For this reason, though the department is concerned over the clam



situation, it is not now planning to recommend any changes in the Pismo clam regulations.

The expected period of poor digging should not continue indefinitely; however, the time of recovery of the clam population to a healthy state cannot be predicted at this time. Such a forecast will be made when the investigations reveal that a highly successful group of young clams has settled down to a prosperous existence on the beah. Of late, environmental conditions have been such that this event has not occurred at Pismo Beach since 1946.

How It's Done

Perhaps this view of some of the methods and results of the November, 1956, census will illustrate better what is happening at Pismo Beach:

As in past years, the census was conducted by digging a series of trenches out into the surf from a starting point on the beach.

One of these six-inch-wide strips, for example, was started 330 feet from the seawall just north of Pismo Beach pier.

All sand dug was carefully sifted and strained for clams.

The first clam was encountered after about 140 feet of digging.

In all, 480 feet of trench was checked for clams. The stopping point was 810 feet from the seawall, about opposite the bait house on the pier.

The six-inch-wide strip yielded 49 clams, ranging in age from 18 months to 10 years. No clams of this year's hatch were found, indicating that 1956 was another poor spawning year.

From 400 to 700 clams, mostly young ones, would normally have been taken in such a trench in the years when spawning was good.

Only four of this year's 49 clams were legal-size. All four were 10 years old. Of the others, 35 were four years of age, seven ware younger than four, and seven, including the four legals, were 10 years old.

Thus four-year-old clams, of the 1952 hatch, now predominate, even though 1952 was only the best of a series of poor spawning years.- There are few younger clams on the beach, and older clams from the previous good years are beginning to disappear.

Similar results were obtained from the other trenches dug this year.

Past censuses have shown that of every 1000 clams which survive their first six months on the beach, only five are still alive seven years later. Between the ages of 7 and 12, as the clams reach legal size, the mortality rate is even higher. At this stage, man is the principle predator. After about age 12, death from old age begins to take an increasingly heavy toll.

Drop Predicted

Several factors regarding the clam population at Pismo Beach are evident from the census information.

1. By about 1958, all the clams remaining from the 1946 hatch will have attained legal size.
2. Not many of these clams will still be around in the intertidal areas where digging takes place.
3. None of the hatches since 1946 has been of sufficient magnitude to seed down for good digging.
4. Even if a good hatch should occur in 1957, only 15 percent can be expected to attain legal size by 1964.

Thus, with no great number of young clam growing to legal size each year, the yield of clams after 1958 can be expected to drop well

below average for an undetermined length of time.

At present rates of harvest, however, diggers will not exhaust the current clam supply until the clams reach the age (12 to 16 years) at which the bulk of them would probably start to die off from natural causes anyway.

This is why closed seasons, closed areas, or bag limit restrictions would have little practical effect in preserving the brood stock.

In fact, in the light of present knowledge, there does not seem to be much man can do to improve the situation.

Spawning Facts

Biological investigations carried on with the census have produced the following additional facts which show why this is so:

1. A female Pismo clam five inches or greater in diameter will spawn approximately 15,000,000 eggs per year. About one-half the clams on any given beach are females. Thus a relatively small brooding stock is still sufficient to repopulate the beaches, if other conditions are right.
2. Some spawning probably takes place every month of the year at Pismo Beach. Peak spawning occurs in the summer and fall.
3. Although the free-floating clam larvae set only in the intertidal area on the beach, both offshore and inshore populations join in the spawning.
4. The main clam populations are in the intertidal areas. However, there are also fairly good populations of legal clams offshore, in depths up to 10 to 20 feet. Four to eight clams to the square yard is about the heaviest concentration. But scattered over such a large area, and virtually untouched by diggers, these offshore clams should represent a more than adequate spawning reserve.
5. Most of the clams in this offshore population are less than 15 years of age. Though clams probably start to die off from old age after they reach their twelfth year, some at least can be expected to live on to an age of 25 years or more.

For some time to come, then, these offshore clams will form a reserve, the spawn of which can repopulate the entire intertidal area at Pismo Beach and Morro Bay—if and when spawning conditions again become satisfactory.

The clam population today is still at a fairly high level.

There's little doubt, however, that clamming is bound to get worse before it gets better.

An enthusiastic clammer will still be able to bring in more than enough clams to make his trip worth-while.

But for a time, at least, he's going to have to get a lot wetter, and dig a lot harder, in order to do it. ★

Fishery Advisory Committee Meets

The American Fisheries Advisory Committee, at its fifth meeting held recently in Biloxi, Mississippi, recommended expansion of activities and services aimed at increasing markets for fishery products of domestic origin, reports Assistant Secretary of the Interior Ross Leffler.

The latter is chairman of the committee and presided at the meeting. He urged the committee members to visit Service offices and installations, to meet its personnel, to ask questions and to offer suggestions and criticisms.

The committee stressed the need for continued market development activities, market research, education of consumers on the nutritional values of fishery products, and various types of fundamental research in all fields of activity authorized by the Saltonstall-Kennedy Act.

Members of the committee visited the newly completed Fishery Laboratory at Pascagoula, Mississippi, where the Service's exploratory fishing and technological activities in the Gulf of Mexico area are being conducted.

Of the 16 active members of the committee, 14 attended the meeting. Those from the West were: Chris Dahl, Petersburg, Alaska; Mark L. Edmunds, Garibaldi, Oregon; Donald P. Loker, Terminal Island, California; Arthur H. Mendonca, San Francisco, California; Thomas F. Sandoz, Astoria, Oregon.

The next meeting is scheduled for Juneau, Alaska, in the latter part of August 1957.

Alaska Statehood Bill

The House Interior Committee approved the Alaska Statehood bill but killed a provision for a separate statehood referendum.

By a vote of 17 to 14 the committee voted down the fish amendment proposed by Congressman Westland of Washington. The amendment would have retained Fish and Wildlife administration in the Federal Government for a period of five years after statehood went into effect. Delegate Bartlett of Alaska vigorously opposed the Westland amendment.

The committee also voted to kill a provision giving the Federal Maritime Board exclusive jurisdiction over commercial traffic from Alaskan ports to other United States ports.

The measure allows the Defense Department to withdraw a large section of the territory in the north and west for use as a defense reservation, but provides that towns along Alaska's major rivers will remain within the state.

Of course all the above is subject to further changes before final approval, but at least some headway is being made.

Marine Man of Year

Edward W. Allen—attorney, poet, world trade enthusiast and international fisheries authority—was named as Puget Sound's Maritime Man of the Year for 1957.

At a banquet sponsored by the Puget Sound Maritime Press Association, the Man of the Year Plaque was presented to Allen principally in recognition of his years of service to the nation on various international fisheries commissions. Some of those commissions have been credited with helping restore halibut stocks of the North Pacific and salmon stocks of the Pacific Northwest.

When he left the International Pacific Halibut Commission in 1955 after 23 years service, Allen was praised as American fisheries's man of the year. From 1937 to 1950 he served on the International Pacific Salmon Fisheries Commission, and he has been an American representative on the International North Pacific Fisheries Commission since it was organized in 1954.

SEA SECRETS

Grunion

Question:

How deep in the sand do grunions deposit their eggs?

Answer:

The beach-spawning grunion deposits its eggs in pods two or three inches below the surface. These fish usually spawn on the high spring tides which accompany the full and the new moon. As a result of tidal action after the eggs have been deposited it is possible for the eggs to become covered to greater depths. Under ideal conditions they are uncovered by the next series of high tides when they hatch out.

During the short period that the eggs are in the beach sands they are preyed upon by beetles and birds. It also has been reported by the California Fish and Game Department that ground squirrels have made diggings along the same contour levels as the eggs are found; one squirrel was found to have over 400 grunion eggs in its stomach. Thus, even though the grunion protects its eggs from numerous predators in the sea it does not conceal them well enough to be safe from some terrestrial enemies.

High Waves

Question:

How high do waves have to be for the sea to be called rough?

Answer:

The state of the sea may be expressed according to the following scale:

Height of Wave	*Description of Sea*
0 or less than 1 ft.	Calm sea
1 to 2 feet	Smooth sea
2 to 3 feet	Slight sea
3 to 5 feet	Moderate sea
5 to 8 feet	Rough sea
8 to 12 feet	Very rough sea
12 to 20 feet	High sea
20 to 40 feet	Very high sea
40 feet and over	Precipitous sea

Lampreys

Question:

Do lampreys similar in habits to those found in the Great Lakes occur in the Pacific Ocean?

Answer:

There are lampreys in the Pacific similar to those found in the Great Lakes. The Pacific species is *Entosphenus tridentatus* and may be found along the coast from southern California to northwestern Alaska.

During the spring months adult lampreys, a foot or more in length, pass up the rivers from the sea. Their purpose is to reach riffles over gravel beds where they prepare their nests. They make a mound of gravel by rapid movements of their bodies and deposit their eggs during this process. They usually die after spawning but the eggs hatch in a few weeks to replenish the stock.

The young lampreys may spend two or more years in the fresh water, after which time they change form and proceed towards the sea to commence attacks on salmon, trout and various other fishes.

After a period at sea, their efforts to return to the rivers to spawn are pursued vigorously. When faced with swift currents or rapids they manage to maintain their position by holding on to the smooth surface of a rock. At a favorable moment they swim forward to a new position, again securing a hold. This process is repeated until they pass the obstacles and the spawning beds are attained.

Shark Damage to Nets

Question:

How do commercial fishermen combat sharks which damage their nets?

Answer:

Many fishermen have used guns to kill off sharks in areas where they wished to fish, but this method has not been too successful. Harpooning has also been tried but is too time consuming a method to be effective. The Department of Fisheries in Canada have devised means of combating basking sharks which have become a growing menace to certain salmon fisheries along the British Columbia coast. They have fitted the bow of one of their vessels with a pointed steel ram, sharpened on the forward end and hinged so that it may be carried in a closed position when not in use. In operation the cutting edge of the ram is just beneath the surface of the water and faces upwards. When sharks are sighted the vessel is headed directly for the school and individuals are picked out and rammed. This action reduces the numbers of sharks and also tends to scatter the schools, making it more feasible for fishermen to operate their nets in the area.

Lobsters

Question:

Why are soft shelled lobsters more difficult to hold alive than hard shelled ones?

Answer:

Even though uninjured by handling the soft shelled lobsters will not stand as extreme water conditions as hard shelled ones and are more quickly killed by high temperatures or low concentrations of dissolved oxygen in the water. Much of the difficulty, however, in holding soft shelled lobsters alive is that they are injured by other lobsters kept in company with them. Then, too, damage caused in handling decreases their chances of survival.

United States Earthquakes

Serial No. 793 — *United States Earthquakes,* 1954 — was recently published by the Coast and Geodetic Survey. The new publication describes earthquake activity in the United States and dependencies during 1954 and provides a record of the work of the Coast and Geodetic Survey in collecting all types of earthquake information including instrumental records of destructive earthquake motions and descriptive reports from shaken areas.

The booklet summarizes the earthquake locations obtained by processing reports from many foreign and domestic seismograph stations. This information serves in mapping seismic areas and in promoting public safety through better understanding of earthquake phenomena. The Coast and Geodetic Survey maintains a Seismological Field Survey in San Francisco to collect earthquake information and make field investigations of strong shocks in the Pacific Coast and western mountain States.

Also included in the publication is a list of Coast and Geodetic Survey and cooperating teleseismic stations for which results are published. The expanded epicenter program utilizes the communication facilities of various cooperating Federal Agencies in exchanging telegraphic data with many foreign stations. Through this service the locations of 213 epicenters were reported during 1954. Teleseismic data and results are published in the Seismological Bulletin issued monthly by the Coast and Geodetic Survey.

A number of illustrations are given in Serial 793 showing destructive and near destructive earthquakes in the United States; United States earthquake epicenters, 1954; various areas affected by earthquakes; and tracings of acceleograph and displacement meter records.

Copies of *United States Earthquakes, Serial No.* 793, may be purchased for 55 cents per copy from the Superintendent of Documents, Washington 25, D. C.

N.F.I.'s New Officers

Aldo Casaretto, Koulouris & Casaretto Company, Los Angeles, California, was named President of the National Fisheries Institute at the twelfth annual convention in Chicago last month. Vice Presidents elected from the West were:

Region 4—T. Neil Taylor, Norfish Sales Company, Oakland, California, Region 5—William C. Eardley, Sr., Eardley Fisheries Company, Seattle, Washington.

Tuna in Brine Imports

The quantity of tuna canned in brine which may be imported into the United States during the calendar year 1957 at the 12½% rate of duty is limited to 44,528,533 pounds. Any imports in excess of that quantity will be dutiable at 25% ad valorem.

Imports under the quota from January 1 to May 4, 1957, amounted to 12,540,107 pounds, according to data compiled by the Bureau of the Customs. This leaves a balance of 31,988,426 pounds of the quota which may be imported during the balance of 1957 at the 12½% rate of duty.

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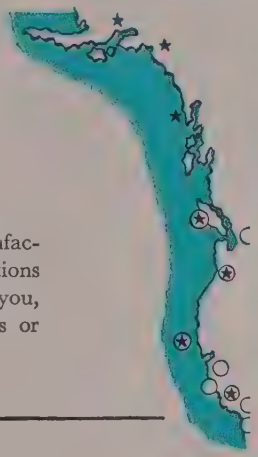

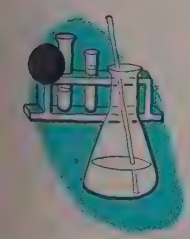

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ALBACORE NEWS

By HAROLD B. CLEMENS
Marine Biologist
California Department of Fish and Game

THANKS to cooperating albacore fishermen, gathering of basic catch statistics resulted in information on 1000 fishing trips during the 1956 season. These data were collected from all major ports of landing in California and clearly reflect the fishing activities of the albacore fleet.

Measurements reveal that the fishery depends primarily upon three size groups, apparently fish of one, two, and three years of age, respectively. The two-year group is by far the heaviest contributor to the total catch. This means that heavy mortality among newly hatched albacore during any one spawning period could result in a marked decrease in total coach two years later. At present, methods are being studied that we hope will enable us to predict good or poor seasons one year in advance.

These measurements also demonstrated that albacore were two to three pounds heavier last season than the average for the past five years. We do not know what caused this unusual increase in weight. Possible explanations are: (1) food may have been more plentiful during the spring of 1955, or (2) the majority of albacore may have traveled a much shorter distance during their offshore migration (1955 season's tagging was the first that failed to produce returns from Midway or Japan).

It is interesting to note, however, that this increase in size appeared during the same season in which albacore schools stayed in fairly close to shore during the northward migration, resulting in good September catches from Baja California to the Columbia River area. By comparison, during 1955 albacore schools started moving offshore in the San Francisco region and were well outside the range of most commercial vessels by the time they reached an area off central Oregon.

We believe a more stable, high-level albacore harvest can be achieved if adequate information concerning this resource is gathered on a continuing basis. Understanding the pattern of past events can provide insight into the future. Albacore fishermen are providing a *vital* part of this necessary data through excellent cooperation in logging details of their fishing trips.

It is hoped that Captains having completed log records in their possession will mail them in promptly. Those needing new log books can get them at our Terminal Island laboratory or from Department of Fish and Game field personnel when they contact the vessels.

Shortages of boat time prevented our tagging as many albacore as planned last year, although 800 were released in good condition. Important information was obtained concerning growth rates, migrations, and relative ages of different size groups. For example, seven- to 13-pound albacore tagged one season and caught the next had grown at an average rate of just over one-half pound per month.

This means that a majority of the albacore present during one season *could* reappear in the fishery one or more following seasons before attaining a weight of 40 pounds—a size that is taken only in small quantities on this coast. Tag returns reveal that some fish *do* reappear in the fishery. In fact, 70% of the recoveries from albacore tagged in 1955 were caught during the 1956 season.

Tagging and log book information indicate that albacore move up coast in pulses, each pulse consisting of a group of schools. Also, these school groups vary in size and travel at different rates of speed depending somewhat upon their distance offshore. For example, school groups within 60 miles of the coast have traveled 100 miles in a northerly direction in one month, while albacore tagged in school groups well outside of Guadalupe Island have moved 500 miles northward in a month. This means that fishermen drifting for an evening in coastal areas have a better chance of speedily relocating schools the next morning than do the offshore fishermen.

During 1952, when albacore schools swept in relatively close to shore, a larger number of fishermen were able to spend more actual fishing time working these slower moving albacore. The reverse was true during 1953, when school groups were farther offshore and traveling faster. Sixteen million more pounds were landed in 1952 than in 1953.

Since some fish were tagged and recovered the same season, it is apparent that there is a consistent mass migration northward. In some years the majority of school groups migrated well offshore, and a lower total catch resulted.

Three albacore were recaptured during the same season south of where they were tagged. It is believed that during some years approximately 4% of the fish will deviate in this way in their migratory habits. These erratic movements are not considered indicative of the normal.

Analysis of 1955 log book records revealed catches made in water with

surface temperatures ranging from 55° to 77°F. Although waters of 66° to 64°F. were the most productive, there was no relationship between fish size and surface temperature. All sizes were found in each of the above temperature categories.

Present plans do not includs a full-scale study of albacore food habits, but we are interested in obtaining the many items spit up on deck by albacore. Identification of these food items can provide good information concerning albacore habits. For example, collections brought in by R. G. Hamilton show that many surface-feeding albacore captured during daylight hours had recently fed, possibly the previous evening, on fish that usually live several hundred fathoms beneath the surface of the sea. This is an environment of tremendous pressure, cold temperature, and little or no sunlight.

The ability of albacore to tolerate great environmental variation while feeding may result in their continually seeking a depth productive of desirable food items. Thus, they may spend a lot of time feeding deep while traveling through some areas. This makes them less available to a surface fishery. Conversely, while moving through other areas they may do more surface feeding.

Knowledge of preferred food items from various locations each month may enable us to locate areas that consistently provide shallow feeding. This could lead to an ability on our part to predict what the best fishing areas and depths would be during the various months.

Our present plans for next season are: (1) Participate in a 10-vessel albacore exploratory fishing survey off northern California, Oregon, and Washington during July. (2) Conduct an exploratory fishing and oceanographic cruise off Baja California immediately prior to the regular albacore season in an effort to intercept and delineate school groups as they approach the coast. (3) Continue tagging with California "spaghetti" tags. (4) Distribute log books and gather basic catch statistics.

Each line of work is undertaken with a single purpose in mind: to increase the albacore harvest to a maximum while decreasing required fishing time and effort to a minimum. Assistance of *each* Captain in every way possible is of utmost importance and will be sincerely appreciated. *

Tuna Fishing Permits High in Japan

Record-breaking catches made along the Japanese Pacific coast last year by tuna seiners have caused coastal shipyards to enjoy a seiner construction boom. Because of the desire of the operators to qualify for government financing for these new seiners, efforts are being made in various fishing ports to buy up tuna fishing permits.

Tuna Fishing Off Marquesas Islands

The Japanese tuna vessel No. 10 Seisho Maru (720 tons), recently worked in the southeastern Pacific and reported a new tuna fishing ground on the eastern side of the Marquesas Islands. According to this report, the new ground is in the vicinity of 6°S., 126°W,. and the vessel made catches day after day of 16 to 20 tons, which beats the catches made on the Indian Ocean grounds.

The catches are composed of yellowfin and big-eyed tuna and black marlin. The fish are large, mostly 160 to 300 pounds, and it looks as if the fishing may be good there throughout the year.

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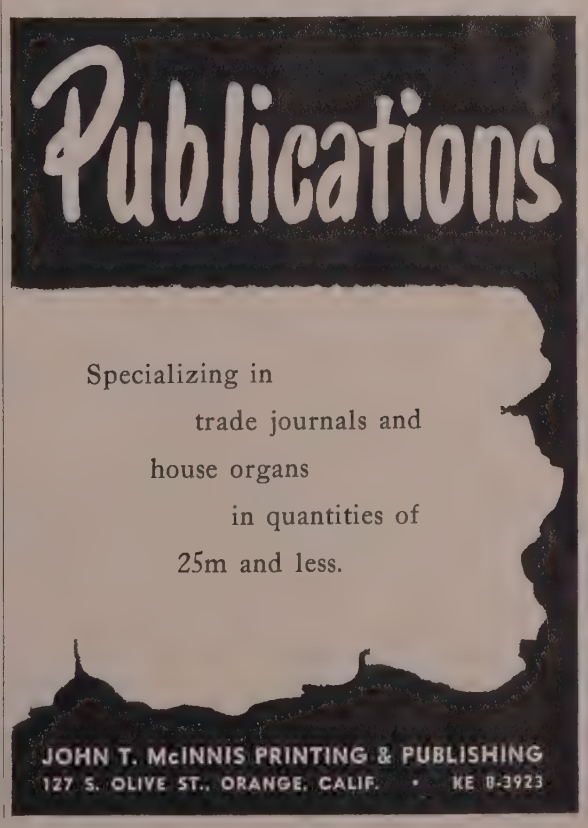


Pacific Oceanic Fisheries Investigations

Quarterly Report
January 1-March 31, 1957

PERHAPS the most significant development during the quarter was the formulation of long range plans for POFI research. These plans involve a change in objective from *describing the tuna resources of the Pacific* to *increasing the efficiency of harvesting these resources.* Some plans are relatively short range and others of a long term nature. Various research projects follow.

Equatorial Tuna Research

Processing and preliminary analyses of the oceanographic and biological data from the September-October 1956 cruises of the *Hugh M. Smith* and the *Charles H. Gilbert* to the Marquesas were completed during the quarter. This data suggests that the westward flowing waters of the South Equatorial Current are affected by the land masses and the submerged, but shallow, banks of the Marquesas and Tuamotus islands.

During August of 1956 a complete circuit of the Marquesas group was made for the purpose of enumerating tuna schools at the surface. During January 1957 and approximately a month later in February, similar circuits were made, with the following results:

	Schools sighted
August 1956	33
January 1957	80
February 1957	89

Another vessel, while occuping 10 longline fishing stations during the first 10 days of February 1957, sighted 37 bird flocks indicative of tuna schools in the offshore vicinity of the Marquesas.

It definitely appears that surface tuna schools are much more available during the Marquesan summer than during their winter.

It further appears that deep-swimming tunas are more available during the Marquesan summer. Five longline fishing stations were occupied in early September 1956 in the offshore Marquesan area and 10 were occupied in the same area in early February 1957 with the following results:

	Catch per 100 hooks (all tunas)
September 1956	1.55
February 1957	3.90

Surveys of live bait resources made during both Marquesan summer and winter indicate adequate supplies of Marquesan sardines are available for a fishery of limited size.

The establishment of a pattern of ocean monitoring stations designed to describe seasonal and annual variations in mid-ocean is nearly complete. During the quarter collection of surface temperature and salinity data was started at six locations.

Albacore Program

During the past quarter studies of the POFI albacore catch data have been almost completed. An estimate of the catch per unit of effort of subsurface albacore by longline and the troll catch per unit of effort was made for various temperatures.

The winter estimated showed a peaking of the catch at about 56°F. to 58°F. with the majority of the catch being made between 55°F. and 63°F. Although the data are few, all sizes of albacore were taken over approximately the same range of temperature. The fall temperature ranges were too broad to provide a reliable estimate, but there did appear to be a peaking at 56°F. or at about the same temperature noted for the winter catch.

A breakdown of the data as to season (summer and fall) and area (eastern and central Pacific) showed two paramount features. First, the central Pacific albacore have the overall temperature range described above while the eastern Pacific albacore are restricted to the center of the temperature range. Second, the peak observed at 63°F. was associated with the fall catches in the eastern Pacific.

We learned that the Japanese have two tuna tagging programs underway. The Kanagawa Prefecture Fishery Experiment Station is sponsoring a tagging program in the longline albacore fishery. During the past win-

ter about 800 tagged fish have been released in the Pacific and Indian Oceans by the commercial longline vessels. The Nankai Regional Fisheries Research Laboratory is making preparations to tag about 1,500 albacore in the summer live-bait fishery off Japan.

No field work was done during the past quarter but plans were completed for an intensive survey of a band approximately 350 miles wide off the west coast between Point Arguello, California, and Destruction Island, Washington. The plan is to have 10 commercial vessels make an intensive trolling survey of the area while two POFI vessels patrol the area collecting biological and oceanographic data.

Baitfish Studies

On October 12, 1956, adult tilapia were placed in redwood tanks at the POFI laboratory, the purpose being to examine this rearing method as a means of producing young fish for tuna bait. The first young were observed on December 20, 1956. Since that date one tank has been in continuous production, with 64 females producing 14,000 young in about 100 days. In a second tank with slightly different temperature and light conditions, relatively few (2,600) young were produced.

We have learned that young tilapia can be reared to optimum bait size (1½ to 2½ inches) for skipjack fishing in two months. We have also found that even the young fish are very cannibalistic, therefore the different size groups must be segregated.

A second meeting of the Baitfish Research Coordinating Committee was held and a plan adopted for POFI and Hawaiian Tuna Packers, Ltd., to collaborate in studying the production of bait-size tilapia in two large ponds near Honolulu. From the information obtained by the end of the summer we will have a measure of the bait fish production from a known number of adult fish, with the feeding and harvesting costs; we can then evaluate this method of tilapia culture for producing bait fish.

The largest introduction of Marquesan sardines to Hawaiian waters was effected in March when 12,000 were released along the south coast of Oahu. The fish were in fine condition. Within a week after the release two were taken by Oahu bait fishermen, one near Honolulu and the other on the north coast of the island.

Miscellaneous

During the quarter the bigeye tuna catch data from the Hawaiian longline fishery (1948 through 1955) were summarized and the analysis completed. The results gave firm evidence that the major part of the increase in bigeye landings for the eight-year period under study was due to a shift in fishing grounds of the larger vessels from a general localized fishing effort around Oahu to an increased amount of effort being expended in the Hana, Maui, and Hilo, Hawaii, areas. These latter areas are considered to be good bigeye fishing grounds.

A cursory study of the yellowfin catches showed that the windward sides of the islands are better bigeye grounds than the lee, whereas for the yellowfin the reverse is true. If this can be accepted, then it explains the drop in yellowfin catch rate when the fleet moved from the lee of Oahu to the windward side of the islands of Maui and Hawaii.

These results are particularly interesting because earlier investigators had attributed the marked changes in Hawaiian landings to changes in the distribution and/or abundance of the fish themselves! *

Moose in Alaska

Real moose and "low bush moose" are making news in Alaska, it is reported by Fish and Wildlife Service personnel of the Department of the Interior.

The "low bush moose," which actually is only the lowly rabbit, is substituting for caribou meat this winter in the native diet in the Kobuk and Naotak river area north of the Yukon.

For some reason unknown to biologists the migration pattern of the caribou herds in Alasks has changed considerably in the recent past. This winter there were only a few caribou in the lower reaches of these rivers. Hence the natives switched to rabbits, which are reasonably abundant in that area, for the main portion of their diet.

Real moose also are getting attention because only about 100 of them were killed during the past winter by trains on the Alaska railroad. This is a fraction of the usual kill. The low mortality is credited to the light snowfall during the winter months. In periods of heavy snow, the moose prefer to travel along the snow-free railroad track rather than break their own trails through the heavy drifts. Under these conditions, in spite of extreme precautions by the crews, train kill is heavy when great numbers of moose move along the railroad tracks.

New Japanese Tuna Vessels

The Miho Shipyard in Shimizu has launched the first of six combination live-bait and long-line tuna vessels ordered by the Omæzaki High-seas Fisheries Association, the No. 1 Nikko Maru (310 tons). This vessel is characterized by its suitability for both types of tuna fishing, by its large carrying capacity, and by an ammonia plant with a freezing capacity of 6,600 pounds a day.

It has a top speed of 11.5 knots, cruising speed of 10 knots, and 65 days cruising range. Equipment is quite modern, including automatic pilot, loran, echo sounder, and a remote sea-water thermometer. Construction cost was US$330,000. It is expected that the remaining five vessels will be completed by August 1957.

"This Is What a Geese Is"

An essay by a youthful naturalist whose powers of perception surpassed his ability to spell produced this descriptive gem. The youngster entitled his theme: *And This Is What a Geese Is.*

"Geese is a low, heavy set bird which is mostly meat and feathers. His head sits on one side and he sits on the other. Geese can't sing much on account of dampness of the moisture. He ain't got no between-the-toes and he's got a little balloon in his stummick to keep from sinking.

"Some geese when they get big has curls on their tails and is called ganders. Ganders don't haff to sit and hatch but just eat and loaf and go swimming. If I was a goose I'd rather be a gander."—*Ducks Unlimited Quarterly.*

Fisheries Loan Fund

A total of 234 applications for fishery loans, totalling $9,838,861 had been received by the Fish and Wildlife Service up to May 20.

Of these, 99 have been approved for a total of $2,842,217, and 31, amounting to $502,466 have been declined because of ineligibility or other reasons.

PROGRESS & PRODUCTION

Marine Enamel

A new development in Marine Enamel was used by Charles and Raymond Loetscher when they broke the record for the world's longest speedboat race, up the Mississippi from New Orleans to St. Louis in 52 hours and 53 minutes. It skimmed upstream through mud, sand, twigs, debris as well as treacherous currents —reaching speeds of over 55 miles per hour up the river—and the Loetscher brothers said the paint used on the boat came out undamaged.

Staley Marine Enamels are quick-drying and durable, resisting water, weather, oil, acid, sun, salt and hard water. For either wood, metal or composition materials, it protects all exterior and interior surfaces and is available in all popular colors. Staley Paint Manufacturing Co., 5243 Manchester, St. Louis 10, Mo.

Diesel Control Expands

For the second time in less than 18 months, the Marine Pumps Division of Diesel Control Corporation, Wilmington, California, has expanded their plant facilities to handle their increasing volume of Diesel engine sales, injection system servicing and test equipment manufacturing. A new building will be used mainly for display and inventory of Allis-Chalmers (Buda) Diesel engines, and an extensive parts department.

According to Stanley E. Franklin, Secretary-Treasurer of the firm, they will now be able to carry a complete line of Allis-Chalmers engines and service parts for marine applications. Diesel Control Corporation is also distributor for American Bosch, Roosa-Master, Bendix, Demco, Robert Bosch lines of fuel injection equipment.

Marine Radiotelephone

The latest addition to the Kaar marine radiotelephone line is a compact unit (only 17x12¼x8¾ inches) designed to meet the requirements of craft owners who want high power in a unit of small dimensions.

This model features "more voice power," a new anti-fade squelch system, and technical advancements that exceed all present and proposed FCC standards. In addition, there is an automatic noise silencer to minimize the effects of atmosphere and engine interference. Six channels cover the buyer's requirements.

Remote control unit available at slight extra cost. Kaar Engineering Corp., P.O. Box 1320, Palo Alto, California.

Fork Truck

The illustration shows a 2000-lb. capacity Aisle Saver truck, specially designed for dependable operation in the lowest temperatures encountered in cold storage operation.

This extremely compact and maneuverable fork lift truck is well adapted to the prime requirement of saving space, also completely dependable in low temperatures. Manufactured by Barrett-Cravens Co., 628 Dundee Road, Northbrook, Ill.

Nylon Nets in India

The excellent catches made by Indian fishermen using a mechanized boat and nylon nets, demonstrated to them by experts of the Food and Agriculture Organization (FAO), Rome, is creating a strong demand in India for modern fishing boats and gear.

Before the FAO expert trained these fishermen in the operation of the boat and gear, few of them had seen a mechanized boat. But they have demonstrated their skill in hanhave demonstrate dtheir skill in handling the boat and gear, the FAO expert has hired out the boat and gear to them on contract, charging a commercially justified share of the catch and has left them to prove for themselves the value of modern boats, gear, equipment and techniques.

Nylon gillnets can also be used in fishing from local log-rafts and small sail or rowing boats. There are thousands of such craft in India, which offers a very good chance of quickly increasing the Indian fish catch if nylon nets can be widely introduced.

New Anchor

Ranging from the 2½ pound to the 21,000 pound, the line of Danforth Anchors now adds the 130-pound Standard Anchor (Model 130-S).

This fills the gap that formerly existed in the Standard line between 85-S and the 180-S.

Like all Danforth Standard Anchors, the new 130-S is fabricated of special high-strength alloy steels having two to four times the strength of mild steel. For further information write to Danforth Anchors, 2159 Allston Way, Berkeley 4, Calif.

Polyethylene Boat Fenders

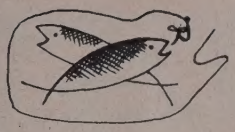
A new protective boat fender is designed to provide gentle impact action under hundreds of pounds of pressure without marring boat surface. Made of Polyethylene Plastic, it is said to be practically indestructible and impervious to salt, sun, water, oil, gasoline, and grease. The materials are self-lubricating, providing a constant slippery surface that cannot mar paint or varnish.

Donray Boat Fenders are beautiful as well as non-fading red, white, or blue colors. Descriptive literature available from Donray Products Co., 110 Heights-Rockefeller Building, Cleveland 18, Ohio.

Direction Finders

Kaar Engineering Corporation will concentrate its direction finder activities this year on two new models—basically the same unit but one with an inside loop model while the other has the loop mounted outside the cabin. These new units stress simplicity of operation, along with new straight forward circuits so necessary for precision navigation instruments.

Small but rugged, both units incorporate other features such as an automatic noise limiter, tuning meter, and two crystal controlled channels. Write Kaar Engineering Corp., P.O. Box 1320, Palo Alto, Calif.



Samoan Expansion

The United States tuna canning company located in American Samoa is planning the construction of a larger refrigeration plant, a new dock adjacent to the cannery, and dwelling houses for stateside employees. At the present time due to good production all warehouse space is occupied and operations are limited by this lack of space, according to recent reports.

Fishery Statistics

Shipments of canned salmon in the calendar year 1956 totaled only half of 1955 exports. Only half as much went to the United Kingdom in 1956, and Canada received 12% of the amount exported to that country in 1955.

Exports of canned sardines dropped 14% from 45.9 million pounds in 1955 to 39.4 million in 1956.

Shipments of canned mackerel were up 54% this year to 2.3 million pounds.

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With the American economy in general on a high level, and most lines of business apparently destined to remain that way, we believe that the fisheries situation also will shape up quite satisfactorily in the days ahead.

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